

## EFFECTS OF CLIMATE CHANGE ON ADAPTATION OF FARMERS IN NORTH WEST REGIONS OF HERAT PROVINCE

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### **ABSTRACT**

*Agriculture and Climate are mutually dependent. There is a need to understand the effect of climate change on agricultural sector both at global and as well as at regional level. The present study was conducted in 2020, to know the effects of climate change on farmers' adaptation. Ex post facto research design applied for this research. Pre prepared questionnaires have been distributed to 120 respondents in three districts of north - west regions of Herat province and analyzed with the help of suitable statistical tests and the findings showed that, all farmers opined that, wheat's varieties were changed from long duration to short duration, time of planting, switching over to other crops was observed among farmers. Spacing between the rows/plants, quantity of seeds used and quantity of organic fertilizer application were increased after 2010. The major constraint to initiate adaptation measures was; difficult to work in the field due to severe temperature and the important suggestion to mitigate the ill effects of climate change was; planning to control and store rainwater through the implementation of watershed management program. Based on the results of this study, it is hoped that appropriate strategies/measures can be worked out to create awareness and learning mechanisms to enable farmers to handle their situations better.*

**Keywords:** adaptation, agriculture, climate change, effect, farmers

### **INTRODUCTION**

Climate change is one of the biggest challenges facing the world today. The problem of human induced climate change first came into force and drew the attention of the scientists and policy makers. The effects of global climate change are many folds and there is a need to create awareness and its impact on various sectors of economy (Vinaya and Tapan, 2023). Changing climatic conditions can have the big effect on our life and our environment. In fact, it is the greatest environmental threat faced by the planet earth. Change in weather conditions can be best observed through the extreme rise in temperature, melting of glaciers and sudden rise in sea level. These changes are causing serious problems to human and other forms of life. It has become common knowledge that the poor are likely to be hit hardest by climate change and the capacity to respond to climate change is the lowest in developing countries. It seems clear that vulnerability to climate change is closely related to poverty, as the poor are least able to respond to climatic stimuli. Furthermore, certain regions of the world including Afghanistan are more severely affected by the effects of climate change than others. Generally speaking, vulnerability and adaptation to climate change are urgent issues among many developing countries. For this reason, there exist provisions in the United Nations

Framework Convention on Climate Change (UNFCCC, 1992) to assist those countries that are thought to be most vulnerable and least able to adapt. Global warming is a phenomenon caused by an increased concentration of Green House Gases (GHG) mostly over the last 100 years. Recent research studies however, suggest that there is a possibility that this gradual global warming could lead to a relatively abrupt slowing of the ocean's thermos line conveyor, which could lead to harsher winter weather conditions, sharply reduced soil moisture and more intense winds in certain regions that currently provide a significant fraction of the world's food production. With inadequate preparation, the result could be a significant drop in the human carrying capacity of the Earth's environment.

The increasing green-house gases (GHG) resulted in global warming by 0.74°C over the past 100 years and 11 of the 12 warmest years were recorded during 1995 – 2006 and also Intergovernmental Panel for Climate Change (IPCC, 2001) estimated projections on temperature predicts an increase of 1.8 to 4.0°C, by the end of this century. Tropical countries are likely to be affected more compared to the countries situated in temperate regions. The brunt of environmental changes is expected to be very high in Afghanistan due to greater dependence on agriculture, limited natural resources,

changing pattern in land use and socio-economic factors that pose a great threat in meeting the food, fiber, fuel and fodder requirement. Global warming due to greenhouse effect is expected to impact hydrological cycle viz. precipitation, evapo-transpiration, soil moisture etc., which would pose new challenges for agriculture. With this background, this study has been designed to understand farmer's adaptation measures initiated due to climate change. The specific objectives of the study are as follows.

### OBJECTIVES

- (1) To study the adaptation measures initiated by the farmers due to climate change
- (2) To understand constraints experienced by the farmers and their suggestions for adaptation to climate Change

### METHODOLOGY

The study was conducted in three districts (Rabat Sangi, Gulran and Kohsan) which are located in north west regions of Herat province.

From each of the selected districts four villages were selected randomly. Thus 12 villages were considered for the study. From each of so selected villages 10 farmers were selected by applying proportionate random sampling. Thus, the total sample for the study was 120 respondents.

The data collected from the respondents were scored, tabulated and analyzed using Frequency and percentage, mean, Standard Deviation and Sign test as statistical tools and techniques.

### RESULTS AND DISCUSSION

#### Farmers' adaptation

A cursory look at the data presented in the table 1, it could be observed, that, all the farmers (100 %) were expressed that, they changed varieties from long to short duration, switching over to other crops, change in planting dates, increased the quantity of fertilizer application and increase the quantity of seeds used as adaptation measures initiated after 2010.

**Table 1: Adaptation measures initiated by farmers in response to climate change**

(n=120)

Sr. No	Statements	Adaptation measures			
		Before 2010		After 2010	
		Initiated	Not initiated	Initiated	Not initiated
1	Wheat's Varieties changed from long duration to short duration, switching over to other crops and change in planting dates	-	-	120 (100)	-
		I	D	NC	I
2	Spacing between the rows/plants	-	-	120 (100)	113 (94.17)
3	Quantity of seeds used and Quantity of organic fertilizer application	-	-	120 (100)	120 (100)

I=Increased, D=Decreased, NC=No Change

#### Constraints and suggestions

The data in the table 2 revealed that, major constraints faced by farmers to take up adaptation measures to overcome ill effects of climate change were, high temperature which restrict them to work in the field for longer time, higher cost of the agricultural inputs, non-availability of timely inputs (seeds, pp chemicals, fertilizers etc) (Rank

I to III) were rated. Simultaneously majority of the farmers suggested: planning to control and store rainwater through the implementation of watershed management program, early warning has to be given to the farmers about environmental changes, creating awareness to the farmers about appropriate adaptation measures against climate change (Rank I to III), as their important suggestions to mitigate ill effects of climate change.

**Table 2: Constraints and Suggestion in adaptation experienced by farmers due to climate change**

(n=120)

No	Constraints	Responses					Rank
		More severe		Suggestions	More important		
		No	%		No	%	
1	Difficult to work in the field due to severe temperature	120	100.00	Planning to control and store rainwater through the implementation of watershed management program	120	100.00	I
2	Higher cost of the agricultural inputs	120	100.00	Early warning has to be given to the farmers about environmental changes	120	100.00	II
3	Non availability of timely inputs (seeds, pp chemicals, fertilizers etc)	120	100.00	Creating awareness to the farmers about appropriate adaptation measures against climate change	120	100.00	III
4	Low price for the products in the market	120	100.00	Government and NGOs organizations should ensure supplying of production inputs at appropriate time in the villages	120	100.00	IV
5	Non availability of labours	120	100.00	Subsidies/compensation has to be given for the crops to make up the cost of cultivation due to weather aberrations	120	100.00	V
6	Higher labour wage rate	120	100.00	Insurance has to be extended to all crops	120	100.00	VI

Based on the results, it could be discussed that majority of the farmers have taken adaptation measures to mitigate the ill effects of climate change after 2010. It means farmers were moving from medium level of adaptation category to higher group. The reason may be that, the farmers were having more perceiving ability about changes in climate and as well they know what are the measures to cope with climate change to get the more production in the farm. On the other hand, in recent years farming is taking place in small scale with low per capita land availability, low income group, lack of cosmopolitanism. It is highly difficult for them to adapt suitable technologies in their field as the farmers mentioned their major constraints and important suggestions. The results are in compliance with Ahmed et al., (2010), Coretha and Edwin (2012), Fatuase and Ajibefun (2013), Shivamurthy (2015), Deepa (2017), Ifeanyi and Issa (2018), Benedicta et al, (2019), and Ghasura et al. (2021)

## CONCLUSION

Climate change in Afghanistan is not an uncertain, “potential” future risk but a very real, present threat whose impacts have already been felt by millions of farmers and pastoralists across the country. The present research showed how harmful the effects of climate change were on farmers, if the government and partner institutions do not take measures in this field, they will have to leave their rural areas and

migrate to Herat city or other countries, therefore government and development organizations should think over all the situation farmers faced, in order to fulfill their needs to cope up with ill effects of climate change.

## CONFLICT OF INTREST

All authors express no conflict of interest in any part of the research.

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